

[0045] The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A fiber optic pressure sensor apparatus for measuring pressure in a medium, comprising:

a light source;

a reflective sensor diaphragm movable in accordance with said pressure in said medium;

optical fiber coupled to said light source for delivering a first wavefront of light to said reflective sensor diaphragm, said optical fiber further comprising:

an endface which is separated from said reflective sensor diaphragm by a gap, said endface receiving a second wavefront of light reflected from said reflective sensor diaphragm, said first and second wavefronts constructively and destructively interfering to create a modulated optical signal;

spectrometer means coupled to said optical fiber for converting said optical signal into a series of digital values; and,

means for analyzing said digital values to obtain a measurement of said pressure in said medium.

2. The fiber optic pressure sensor apparatus in accordance with claim 1, further comprising:

an optical coupler for coupling said light source, said optical fiber, and said spectrometer means.

3. The fiber optic pressure sensor apparatus in accordance with claim 2, further comprising:

a power monitoring optical detector means coupled to said light source by said optical coupler; and,

means for regulating said light source in accordance with a signal from said power monitoring optical detector means.

4. The fiber optic pressure sensor apparatus in accordance with claim 1, wherein said optical fiber comprises a single-mode optical fiber.
5. The fiber optic pressure sensor apparatus in accordance with claim 1, further comprising: a graded-index lens coupled to said endface of said optical fiber.
6. The fiber optic pressure sensor apparatus in accordance with claim 1, wherein the angle between said endface and a longitudinal axis of said optical fiber is between zero and 11 degrees.
7. The fiber optic pressure sensor apparatus in accordance with claim 1, further comprising a sensor body.
8. The fiber optic pressure sensor apparatus in accordance with claim 7, wherein said sensor body is vented to normal atmospheric pressure.
9. The fiber optic pressure sensor apparatus in accordance with claim 7, wherein said sensor body is sealed at atmospheric pressure.
10. The fiber optic pressure sensor apparatus in accordance with claim 7, wherein said sensor body is sealed using an organic adhesive.
11. The fiber optic pressure sensor apparatus in accordance with claim 1, wherein said diaphragm comprises a diaphragm cap and a diaphragm head.

12. The fiber optic pressure sensor apparatus in accordance with claim 1, wherein said means for analyzing comprises:

means for recovering phase information from said modulated optical signal by taking a Fourier transform of said modulated optical signal; and,

means for deriving a sensor gap measurement from said phase information.